

THE  
HUNTERIAN ORATION,

DELIVERED AT THE  
ROYAL COLLEGE OF SURGEONS,  
IN LONDON,

ON THE  
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BY  
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William Ferguson Esq  
With the Compliments  
of the Author

## HUNTERIAN ORATION.

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MR. PRESIDENT AND GENTLEMEN;

THE duty which has devolved upon me is not unmingled with pain. If it is instructive to dwell upon the merits of that great Name which has to-day assembled us together, if it is agreeable to trace the steps of genius forcing its way from utter oblivion into the meridian blaze of fame, until it has become impossible to discuss the science of surgery without pronouncing the name of John Hunter, it is with regret that we must recount the losses which we have recently sustained, the gaps not easily filled up which death has made in our ranks.

At our last anniversary we had to deplore the loss of Sir Astley Cooper—a man for whom scarcely any panegyric can be too strong, since his fame, as a practical surgeon, was limited only by the boundaries of the civilized world.

This year we have to lament the decease of one whose merits were equally great, but in a different domain of knowledge—of Sir Charles Bell, whose transcendant reputation as a physiologist has, with the mass at least, almost eclipsed his eminent desert as a surgeon.

Sir Charles Bell, though not a pupil, revered the memory of his great predecessor; for if the phrase “*damnant quod non intelligunt*” aptly describes the judgment of the multitude, it is equally true that it requires high and perhaps kindred talent to estimate genius at its full worth.

Sir Charles Bell was born in 1775, and, after studying some years at the highschool of Edinburgh, began the study of anatomy under his brother John. That brother, twelve years older than himself, was already in high repute both as a surgeon and as a lecturer. The instructions of such a teacher could scarcely have been heard without profit by an ordinary pupil: their effect upon Charles Bell was shown by the publication, in his twenty-second year, of the first volume of his “*System of Dissections*”—a work marked by his characteristic originality.

At an early age he was appointed Surgeon to the Royal Infirmary; but the feuds which at that time distracted the profession in Edinburgh, as well as other causes, induced him to try his chance in the metropolis of the world, and Mr. Bell came to London in 1806. The rest of his career is well known to you; at any rate, it is unnecessary to dwell on the professorships which he held, or the other marks of public distinction which were heaped upon him. I



will content myself with touching upon a few of the more prominent points of his genius and character.

As a surgeon Sir Charles Bell ranks high, "if not first, in the very first line." His Letters on the Diseases of the Urethra, his Surgical Observations, and other works, show how deeply he had studied, and how diligently he had practised, the art which he professed. His dexterity and coolness as an operator were remarkable; yet he went to operations with the reluctance of one who has to face an unavoidable evil; in this respect resembling Hunter, and many other first-rate surgeons. Like Cheselden, who is said always to have turned pale when about to cut for the stone, Bell's cheek was often seen to blanch on proceeding to operations performed with the utmost self-possession and skill.

As a proof of the zeal with which Mr. Bell cultivated surgery, I may instance his hurrying to Haslar after the battle of Corunna, and to Waterloo after that of the 18th of June, in order to study gunshot wounds.

Still more eminent was he as a teacher of anatomy. In the lecture-room he shone almost without a rival. His views were nearly always solid; they were always ingenious, and his manner and language enchained the attention of his audience. Dull, indeed, must have been the pupil who could have slumbered when Charles Bell was in the professorial chair. In his hands dry bones lived again, imagination clothing them with the textures which had once invested them; a muscle was no longer a mere bundle of fibres, rising here and inserted there; it was a guide-

to the surgeon's knife in some important operation, or kindling with hidden fires, betrayed by the anatomy of its expression the emotions that lurked within; the flaccid artery on the table spouted forth its crimson stream, and demanded the arresting hand of the skilful surgeon, or threatened death as the alternative. In short, Sir C. Bell made his pupils think; and, interesting as anatomy is, even if considered as a mere branch of natural history, he taught them to value it most of all as a guide to the art of healing. The time, however, will arrive when all the contemporaries of Sir C. Bell, all in whose ears those impressive tones still linger, shall have been swept from the scene. But his fame will yet survive; he will ever be remembered as the discoverer of the varied functions of the nervous system.

Let me be permitted to make an observation or two on the opinions of physiologists concerning this subject, before and since the publication of Sir Charles Bell's views.

It is well known that each spinal nerve arises by two roots; and it is now generally admitted that to the anterior one belongs the power of controlling motion; to the posterior one that of governing sensation. It had formerly been thought that each spinal nerve possessed in common the power of ruling both motion and sensation, and, in some cases, additional functions. This may be called the popular theory. Yet glimmerings of the truth had occasionally been forced, as it were, upon reflecting physiologists. For the ordinary theory was obviously insufficient to explain why sensation remains in a

paralytic limb when the power of motion is lost; and why, on the other hand, motion sometimes survives feeling.

But although it had been conceived by some that the nerves of sensation were distinct from those of motion, no progress had been made in pointing out the principle in the anatomy on which it depends that one nerve ministers to sensation, another to motion; and the singularly original remarks of Hunter in his paper on the Nerves of the Organ of Smell, concerning two or more nerves coming from different sources to supply a single part, had hitherto remained unproductive; they had not fallen upon a congenial soil.

The multiplicity, intricacy of arrangement, and distribution of the nerves, had engaged the eager attention of Sir C. Bell at an early period; and I have it from one, who, on several occasions, so far back as the year 1806, has seen him rise from the contemplation of the subject with the exclamation, "We must make something out of these nerves." And already, in 1807, he had caught a glimpse of the fundamental principle of his subsequent researches, as the extracts I am about to read will show. They are from letters addressed to his brother George Joseph Bell, then at the Scotch bar, now professor of law in the University of Edinburgh—the talents of the family had not been engrossed by anatomy and surgery—and fortunately the letters were written before the revival of envelopes. The first from which I quote bears "in dorso" the post-mark, London, Dec. 5th, Edinburgh, Dec. 8th, 1807.

"My new anatomy of the brain occupies my head



almost entirely. I hinted to you that I was “burning” or on the eve of a grand discovery. I consider the organs of the outward senses as forming a distinct class of nerves from the others. I trace them to corresponding parts of the brain, totally distinct from the origin of the others. I take five tubercles within the brain as the internal senses. I trace the nerves of the nose, eye, ear, and tongue, to these. Here I see established connection—there the great mass of the brain receives processes from the central tubercles. Again, the great masses of the cerebrum send down processes or crura which give off all the common nerves of voluntary motion, &c. I establish thus a kind of circulation, as it were. In this inquiry I describe many new connections—the whole opens up a new and simple light, and the whole accords with the phenomena, with the pathology, and is supported by interesting views. My object is not to publish this, but to lecture it, to lecture it to my friends, to lecture it to Sir Joseph Banks’ coterie of old women, to make the town ring with it, as it is really the only new thing that has appeared in anatomy since the days of Hunter, and, if I make it out, as interesting as the circulation, or the doctrine of absorption. But I must still have time; now is the end of a week, and I will be at it again.”

In another (post-mark, Dec. 1807,) he says, “I really think this new view of the anatomy of the brain will strike more than the discovery of the lymphatics being absorbents.”

And in a third (post-mark, March 28th and 31st, 1808)—“I have been thinking of having a room



five or six miles from town, and pursuing there my physiology of the brain—that which is to make me, I am convinced.” This may be called the second-sight of genius!

At length, in an Essay entitled “Idea of a New Anatomy of the Brain,” printed in 1811, Sir C. Bell developed some of the principles destined to exercise so great an influence on the theory of the nervous system. Having called attention to the prevailing doctrines of the anatomical schools—that the mind, by the same nerves which receive sensation, sends out the mandates of the will to the moving powers—he proceeds to announce his own opinion, that the several parts of the cerebrum have different functions, and that the nerves which we trace in the body are not single nerves possessing various powers, but bundles of different nerves, whose filaments are united for the convenience of distribution, but which are as distinct in office as they are in origin from the brain. Pointing to the fact of the medulla spinalis having a central division, and a distinction into anterior and posterior fasciculi, he relates how he was thereby led to make experiments, of which he describes the results, upon the anterior and posterior columns of the spinal marrow, and upon the anterior and posterior roots of the spinal nerves, and how he thereupon came to the conclusion that every nerve possessing a double function obtains this by having a double root.

Adhering to the important principle thus laid down, Bell next directed his inquiries to the facial nerves, and, aided by his indefatigable pupil and

coadjutor, Mr. John Shaw, instituted experiments to assist him in determining their functions, more especially those of the fifth and that of the portio dura of the seventh pair. These experiments were happily imagined: without the fortunate circumstance that in certain parts of the body, especially on the face, the nerves of sensation and motion are distinct throughout their whole course, the great discovery of Bell could never have been clearly established.

It was about this time, and when making the most important advances in obtaining positive and undeniable proofs of the truth of his doctrines, that we find him, under an impulse like that exhibited in 1807, addressing his brother in Edinburgh in a letter bearing date the 17th of August, 1819, to the following effect:—

“ When you left us, I told you that I was to sit down to my notes of the nervous system. Believe me, this is quite an extraordinary business. I think the observations I have been able to make furnish the materials of a grand system which is to revolutionize all we know of this part of anatomy, more than the discovery of the circulation of the blood. I have a good deal still to do. How I am to bring it forward I do not know. I think by lectures in the first place, then by a little essay explaining the outline of a new system, and finally, by magnificent drawings and engravings of the whole nervous system. In the mean time I am making gigantic drawings of the nervous system for my class.”

The gigantic drawings for his class to which he alludes were large plans of the three great classes of

nerves, under which he arranged those of the human body.

Two years afterwards, in 1821, a general account of the results of his observations was communicated to the Royal Society, in a paper read before that body, and apparently intended as an introduction to others which were to follow, and did follow.

Notwithstanding the novel and important matter which it contained, the Idea of a New Anatomy of the Brain had failed to attract attention. Not so the first paper in the Philosophical Transactions. Bell's views and opinions were now questioned, doubted, denied; then a certain amount of truth was allowed them; and, ultimately, the real and substantial credit of a patient, laborious, and original inquiry, was attempted to be wrested from him, and attributed to others, whose single merit, in this part at least of physiology, consisted in their adoption of that key which Bell had invented, fashioned, and shown how to use—a key without which the secrets of the nervous system, so far as they are now known, had probably yet remained concealed.

In estimating Bell's claims as a physiologist, we are not called upon to regard his papers and memoirs on the nervous system as complete and perfect. Along with all that is distinct and precise, we may allow that there are some allegations not quite specific—allegations which a mind more severely disciplined might not have hazarded. We may grant that the functions of the posterior roots of the spinal nerves were therein suggested rather than positively stated. We may acknowledge, as he him-



self did acknowledge, that he misinterpreted an experiment in his first attempt to prove that which he afterwards did prove through Mr. John Shaw, that the fifth nerve is a nerve of motion as well as of sensation. And we may agree in receiving with doubt, or at least without conviction, as not proved, his views with respect to certain nerves being superadded in the higher classes of animals, for the purposes of respiration.

But, after all these acknowledgments, there remains to Bell clearly and unequivocally the merit of having first shown—

That in investigating the functions of the nervous system, we must direct our attention to the roots and not to the trunks of the nerves.

That the nervous trunks conveying motion and sensation, consist of two distinct sets of filaments in the same sheath.

That the filaments for motion form a distinct root from those for sensation, and that the anterior roots are for motion ; leaving it to be inferred that the posterior are for sensation.

That the portio dura is a nerve of motion, and the fifth a nerve both of motion and sensation.

And lastly, of having been the first who, dissatisfied with the observation and study of the mere form of the various parts of the nervous system, applied the method of experiment to aid him in determining their functions.

In a word, there belongs to Bell the great discovery, the greatest in the physiology of the nervous system for twenty centuries, that distinct portions

of that system are appropriated to the exercise of different functions.

Valuable practical precepts were immediately deduced from these discoveries, and at once applied by Sir Charles Bell and Mr. John Shaw. Perhaps the most important was the distinction of a local paralytic affection from that which depends on disease of the brain. I shall not detain you with cases of this kind, which, since the introduction of this new principle in the recognition and diagnosis of nervous diseases, have been accumulated in the records of medicine. The doctrine, however, and the consequences which ignorance of it occasioned, are well illustrated by a remarkable anecdote in a work where we should not be apt to look for physiological instruction, I mean Grimm's Correspondence; and as the story is little known, I will take the liberty of narrating it:

A physician in Paris, on paying his visit one day, found an Abbé playing at cards in his patient's chamber. Struck by the unfavourable aspect of the Abbé's face, he informed him that he had not a moment to lose, but must be carried home instantly. The Abbé, overpowered with terror, was taken to his lodgings, where, for several days, he was bled, cupped, and purged, till he was brought to the brink of the grave; yet his face still bore the appearance which had so much alarmed the physician. The brother of the patient at length arrived from a distant part of France, and asked what was the matter with his unfortunate relation. "Don't you see," said the bystanders, "his mouth is all on one

side?" "Alas!" he replied, "my poor brother has had his mouth on one side these forty years."

Such cases will, in future, present no difficulty even to the beginner, and we recognise at once in Charles Bell the great characteristic of genius, that of giving the clearness of certainty to what before was either utterly unknown or but obscurely suspected.

Supposing, however, that this were the sole practical lesson as yet deduced from Sir Charles Bell's discoveries, it would be unjust to measure their merit by this alone. Independently of the direct instruction to be derived from them, they have brought physiologists into the true path; and should the thick veil which Nature has thrown over the operations of the nervous system be once drawn up, it will ever be remembered that Charles Bell first constructed the machinery for raising it.

It is instructive to remark and to remember that Sir Charles Bell did not make very numerous experiments on living animals; but, guided by a careful study of the anatomy of the parts, and reflecting on the spontaneous experiments, so to speak, furnished by disease, he was led to form views, which supported by a few well-planned experiments, discovered to him the truth, and enabled him to convert the guesses of former observers into indisputable facts.

Had Sir Charles Bell not been a surgeon and a physiologist, he might have been an artist, so admirable were his drawings, so exquisite his perception of the beautiful. This talent was with him a



favourite, and might be cited as an instance of “ the ruling passion strong in death ;” for he was employed in sketching the gay scenery of Worcestershire but a few hours before his decease. The leisure hours of the last few months of his life had also been employed in preparing for the press a new edition of his work on the Anatomy of Expression. I ought rather to say re-writing it, so much additional manuscript does it present, so many additional illustrations from the study he had recently made of the great productions in painting and sculpture at Florence and at Rome.

It was in the summer of 1840 that his love of art led him to Italy, that he might become more intimately acquainted with the masterpieces that enrich it. During his tour he kept a journal, which I have had the gratification of seeing ; it consists of three volumes of sketches and remarks. He passed through Paris and Lyons, and entered Italy by way of Genoa. Here he was struck by the contrast between streets as narrow as “ Blackford Wynd ” and the gorgeous architecture of the palaces which flank them. His hotel had once been a palace ; and as he sat on a velvet cushion in an arm-chair of gold, while a fountain played from a marble lion, and the too vivid light was moderated by orange trees and silk curtains, he felt that he was in GENOVA LA SUPERBA.

He enjoyed what he calls a day of Raphael in the Vatican, and was worthy of enjoying it. His piercing eye detected, as we might expect, some errors of anatomy in Raphael’s drawings. “ But do not think of that,” he adds, “ but of the fine

comprehension of nature, the feeling and understanding of the human family. Man appears a superb creature in the Vatican."

On the last day which he spent in Rome, he stood by the palace of the Cæsars, from which he took his sketch of the Coliseum. "It is a place," he says, "to raise strange and solemn thoughts." A mountain has been formed there by ruins, now covered with vineyards and cultivated fields. "Pillars and entablatures make the way uneven, and the acanthus is growing by the side of the broken capital, on which it is chiselled."

So much inventive genius and such indefatigable industry are rarely united in the same person; and when we add the warmth of his friendships, and, among his lesser qualities, the exquisite refinement of his taste, the combination is not often to be paralleled. He had some of the irritability that so often accompanies genius; yet, take him as he was, he has left a blank not easily filled up, either in the republic of science, or the circle of his friends.

I need not apologize, I think, for the length at which I have discussed the merits of our illustrious fellow-labourer; for the very conditions of my office require that I should celebrate the deserts of those persons recently deceased, whose labours shall have "contributed to the improvement or extension of chirurgical science."

In this class we must also rank one whose loss was recently felt, not only in the nation where it occurred, but by all Europe, which he had instructed. I mean Larrey.

Larrey was born in 1766 ; became a pupil of his uncle, who practised surgery at Toulouse, and, after seven years' professional education, was appointed surgeon in the navy. He returned to Paris at the outbreak of the Revolution, and, in 1793, was sent as regimental surgeon to the army of the Rhine. If we would have a specimen of the extraordinary energy and indignant resistance with which France then stayed the attack of the first coalition, we may look to Larrey, the most zealous individual of the important class to which he belonged. He invented the *ambulances volantes*, and was the first military surgeon who dressed the wounded under the very fire of the batteries. " It is to Larrey," says one of his panegyrists, " that we owe our place of honour on the field of battle." Such zeal could not fail to win applause ; and Larrey obtained special mention in the report of General de Beauharnais after a battle fought before Mayence in July, 1793.

At the siege of Toulon, in 1794, he gained the friendship of that Lieutenant of Artillery who was destined to shake the world ! He accompanied the French army to Egypt, and served in all the subsequent campaigns of Napoleon throughout Europe. It is needless to detail the honours successively conferred upon Larrey until his social position became equal to his merits ; but I may mention that after the battle of Wagram, he was made Baron of the Empire, and that in 1812, he was made *Chirurgien en Chef de la Grande Armée*. He liked to be called by the title of nobility which he had



earned ; nor was this a childish vanity ; for he knew that neither the chance of birth nor the favour of a court had made him a Baron ; but that the dignity had been bestowed by a discriminating hand which never conferred honours upon incompetency or inefficiency.

His arduous duties did not prevent him from recording a multitude of facts selected from the myriads presented to his observation. Among the works with which he enriched surgical literature, some of the best are—

1. A Memoir on Amputation of the Extremities after Gun-shot Wounds.

2. An Historical and Surgical Account of the Expedition of the French Army to Egypt and Syria.

3. Memoirs of Military Surgery : an elaborate work in four volumes.

Among the valuable principles which he established was the necessity of immediate amputation after gun-shot wounds, pointing out, with nice discrimination, in what cases the operation was indicated. The propriety of immediate amputation had been advocated at intervals for two centuries ; but the large experience and strong sagacity of Larrey first raised it into a canon of military surgery.

Previously to his time, it had been a maxim of practice, when the extremities were invaded by spreading mortification, never to amputate till Nature had fixed a line of demarcation between the sound and gangrenous parts. He first showed that the rule, though general, ought not to be

universal ; and he drew attention to the important distinction between gangrene dependent on a constitutional cause, and that which springs from the severity of a local injury. In the latter, he advised immediate amputation, without waiting for the establishment of a boundary between the dead and living parts ; and the instances which he gave of the successful application of this new distinction have been amply confirmed by the experience of others.

Fortunately for mankind, the clearest intellect is commonly accompanied by a benevolent heart, and the perspicacity of Larrey was equalled by his humanity.

Of all Napoleon's campaigns, that of 1813 was the most equally, the most severely, the most fiercely contested. It was then that Prussia, rising almost to a man, displayed a spirit at least equal to that of France in 1793 ; and in the combats which ensued, the effects of science and art in war were heightened by the heroic, it may be the rancorous, feelings of those engaged.

After the battles of Bautzen and Wûrchen, it was suggested to Napoleon that the number of the wounded had been increased by voluntary mutilation ; and that all who had lost a finger, or whose hand had been pierced by a ball, were traitors who wished to escape from the service.

Napoleon ordered that the wounded of this class, to the number of 1200, should be separated from the rest ; and that a commission, consisting of several principal surgeons, should examine each of

these soldiers. A council of war, moreover, was appointed to try the guilty, and cause them to be executed on the spot. Larrey had been named President of the surgical board. The day before it met, a certain personage, who believing the accusation, desired its success, ordered him to find four culprits in each division, who should be taken before a council of war, and shot instantly. Larrey, filled with terror and indignation at such an order, was about to send in his resignation, and quit the army ; when a friend made him give up the project by observing, that he might be useful to these unfortunate men.

Larrey did not hesitate one moment. The examination was extremely rigorous, and lasted four whole days. Larrey showed, by reasoning on the character of the wounds, that all the accused were innocent. He then addressed a report to Napoleon ; and, believing that he had displeased the Emperor in this affair, composedly awaited the disfavour which was to follow. But Napoleon was not insensible to the claims of truth and of justice when clearly demonstrated and resolutely maintained. The conduct of Larrey was not lost upon him. In the middle of the ensuing night, Baron Fain brought Larrey a most flattering letter from the Emperor, in which he was congratulated on his firm, honourable, and humane conduct. This letter was accompanied by a present of 6000 francs, and the warrant of a pension of 3000 to be paid from Napoleon's privy purse.

In his long exile, Napoleon did not forget his



great surgeon ; besides bequeathing him 100,000 francs, his will records the honourable fact, that Larrey was the most virtuous man he had ever known.

His own escutcheon might have been saved from its darkest blot, had he always encountered the moral fearlessness of Larrey and of Desgenettes.

But I must now approach the great object which has to-day brought us together, and endeavour briefly to describe the peculiar and more prominent points of Hunter's career.

John Hunter was born in 1728, and began the study of his profession at the age of 20. He died in 1793, leaving a reputation as a surgeon and a naturalist beyond that of any other man in the annals of fame. Some few may have been his equals, nay, his superiors, (though that is a bold word,) in either departments singly ; for excellence in both combined he stands without a rival.

He was snatched away too soon from the profession which he adorned ; and if we number his years alone, his death may appear premature ; but if we adopt the theory of the Roman philosophical poet, and measure time by what has been performed in it, we might suppose that Hunter had lived an age. Half a century has now elapsed since his death, and few of his contemporaries are with us ; the voices of envy and of partiality are alike silent in the tomb, and we are called on to estimate what Hunter attempted, intended, accomplished.

The materials for our judgment are to be found

in his books, both printed and manuscript, as well as in his numerous drawings. But it is most of all in his Museum that we appreciate the prodigious extent of his views, bounded only, if that can be called a boundary, by the limits of animated nature.

John Hunter early showed the characteristic features of his mind, the interest he took in physiological inquiries, his capabilities of minute anatomical investigation, and his powers as an original thinker. Within ten years of his arrival in London, he had solved the problem as to the cause and mode of the descent of the testis in the foetus,—had closely examined the connexion between the uterus and placenta,—had made that preparation, the oldest in the Museum, where, tracing the branches of the fifth pair of nerves in the nose, he was led to the conclusion that the organs of sense receive their endowments of ordinary sensation from that nerve, and to the more general proposition, “that if we consider how various are the origins of the nerves, and how different the circumstances attending them, we must suppose a variety of uses to arise out of every peculiarity of structure;” thereby approaching more closely than any one else had done, to the principle subsequently established by Sir C. Bell; and, moreover, he had instituted a very ingenious set of experiments with the view of determining whether the veins possess the power of absorption.

When, soon after, he accompanied the army to the coast of France and the Peninsula, his duties as Staff-Surgeon did not prevent him pursuing those physiological inquiries in which he took so much

delight. He was then engaged in determining, by experiment, whether digestion continues in lizards and snakes during their torpid state ; and he made other experiments on the faculty of hearing in fishes, the organ of which sense he had discovered in these animals before leaving London. At this period, too, were made those observations on gunshot wounds, with which seems to have originated that inquiry which, in its published form, only appeared 30 years afterwards. And in an incidental remark in his paper on the *vesiculæ seminales*, “ that he took the opportunity of opening a man immediately after he had been killed by a cannon-ball, to be more certain of the nature of their contents,” we perceive how strong was his physiological zeal, and how eagerly he seized every opportunity of adding to his knowledge.

There is reason to suppose, that when he returned to London, in 1763, the scheme of his future life and occupations had been already formed. The College possesses a manuscript catalogue in his own hand-writing, apparently written a few months after his return from Portugal, briefly defining the nature of about 200 specimens of natural and morbid structure, grouped together according to organs—the germ of that Museum in which he sought to display all the types and modifications of animal structure.

The great object of Mr. Hunter in the formation of his Museum, was the illustration of life,—in its natural and diseased condition, in plants as well as in animals. Physiology, in its largest sense, was the



aim and scope of his labours ; whether we view him investigating the properties of the seed or of the egg, where life lies sleeping ; displaying each form and variety of organization ; tracing its developments ; observing its aberrations ; deducing the laws of life ; or applying his knowledge of these laws to the explanation of the phenomena of disease, to the prolongation of the existence, or to the relief of the sufferings of his fellow-creatures.

Of the vast basis on which Mr. Hunter raised his superstructure, and of the soundness of the materials of which it is composed, his Museum is the best evidence. At the period of his death, and he was adding to it with unabated zeal up to the last day of his existence, the number of preparations of natural structure alone amounted to nearly 4000.

It is impossible to form a just conception of the beauty and value of these preparations without a detailed examination of the Museum itself, and of the excellent catalogues which have now been drawn up. But you may form some idea of the industry and vast labour expended in its formation, when I state to you, on the authority of one who has had the best means of knowing, Mr. Owen, that there is proof of Hunter having dissected above 500 species of animals, exclusive of repeated dissections of different individuals of the same species, besides those of plants to a considerable amount ; and of his diligence in recording the details of his observations, that at the same period he possessed original records of the dissections of 315 different species of animals.

Not contented with displaying the peculiarities of

their structure, and recording them, Hunter caused most elaborate and accurate drawings to be made from recent dissections of many animals, and for this purpose retained in his family for many years an accomplished draughtsman.

But Hunter's object was not only to dissect, observe, detail, and exhibit a mass of detached facts in anatomy; he had far higher aims than that of a mere collector of facts, even in comparative anatomy; and his feelings on this point were sufficiently expressed when, in reply to an invitation on the part of Sir John Pringle to collect all his dissections of the turtle, and send them to the Royal Society, he stated "that the publication of the description of a single animal, more especially of a common one, had never been his wish."

Mr. Hunter was not merely in possession of numerous and precise facts in anatomy: he approximated them—he compared them together, and, by his superior genius, arranged them in the true order to be followed in comparative anatomy—that of organs; for, as it has been well observed, if species is the object of comparison in zoology, organ is evidently that in anatomy, each having its peculiar function, its distinct office, its special and determinate laws. Of the successful manner in which Hunter disentangled and unfolded these organs, tracing them from one species of animal to another, and exhibiting their modifications, his Museum is the faithful record; and his labours in this respect must assuredly be regarded as the first great attempt to arrange in systematic order the detached facts of comparative ana-



tomy. When I represent his arrangement as that according to organs, perhaps I ought to add, and of function, for although the former was the visible manifestation, the latter was the presiding idea. And the quarto manuscript catalogue, the most valuable Hunterian document remaining to the College, derives its chief importance from the information it supplies respecting the scheme of arrangement, and the general physiological principles intended to be illustrated by the different series of preparations. It was this circumstance which distinguished Hunter from the other most successful cultivator of comparative anatomy in modern times. He studied this important subject with a view to physiology—Cuvier with a view chiefly to zoological classification.

Unfortunately for the earlier recognition of Hunter's high claims in anatomy and physiology, these could not be fairly or fully estimated until his manuscripts were published, within the last few years, by the College, in the physiological catalogue explanatory of his collection. And what must not science, as well as his reputation, have lost in those ten folio volumes of manuscript so shamefully committed to the flames !

But Mr. Hunter's "Memoirs and Essays on various parts of the Animal Œconomy" distinctly show the vast range of physiological subjects which his mind grasped. And those who seek to know what his powers of observation, reflection, and investigation, were capable of, would do well to read his papers on digestion, animal heat, respiration, and



generation, and consult the corresponding parts of the physiological catalogue.

As the vital organs and their functions had occupied a large share of his physiological inquiries, it is not surprising that the views which he thereby acquired were made available by him in his investigation, in his explanation, and in his treatment of disease. The powers of the absorbent system, the structures and properties of blood-vessels, the properties of the blood, the reciprocal influence of the different organs on each other, and a number of other physiological truths, all occupied their place in his pathology and practice. If he may have rated the powers of the lymphatics too highly, and sometimes given them too prominent a place in his views of morbid action, he did not over-estimate the power of absorption—an estimate which, with his true appreciation of the cause of failure in the old operation for aneurism, led to one of the most brilliant improvements in the treatment of disease to be found in the whole history of surgery.

It is scarcely possible to praise this improvement too highly, so great in itself, and so fertile in its results, for it has conferred life upon hundreds. It was not only that a safer and more successful operation was introduced, but this very safety and success led to its application to numerous cases of the disease, which, under the old method, durst not be meddled with, the patients being left to their fate.

Knowing that Mr. Benjamin Phillips had been for some time occupied in collecting from English

and foreign works returns of the number of various capital surgical operations recorded, and their relative success, I applied to him to furnish me with the number he had been enabled to collect upon the subject of aneurism treated according to Hunter's method, and he has been so obliging as to furnish me with the following return :

	Cases.	Cures.
Subclavian . . . .	80	46
External iliac . .	79	62
Carotid . . . . .	74	59
Femoral . . . . .	113	77
Humeral . . . . .	30	24
Various . . . . .	13	9
	<hr/> 389	<hr/> 277

And when you consider that the operation, as an established one, has, of late years especially, been often performed without any record of it being published, you will perceive that I have not gone beyond the truth in asserting that it has conferred life upon hundreds.

Among Hunter's pathological essays, the one on inflammation of the veins may be mentioned with especial praise. He was the first who understood and explained the nature of the malady, and opened the road to the additional discoveries made since his time. In his paper on Intussusception, he ingeniously shows how the different varieties of the disease are produced ; and in his Essay on the Formation of Loose Cartilages in Joints, he satisfactorily

explains their presence by a reference to pathological preparations.

But the loftiest efforts of John Hunter are to be found in his work on the Blood, Inflammation, and Gun-Shot Wounds. The mode of investigation in this masterpiece—the application of physiology to practice—suffices to distinguish him from all preceding writers, and may be considered as the basis of modern pathology. Its influence is felt not merely in surgery, but in medicine, for its principles are catholic. Up to the time of Hunter, surgeons were content to take their general view of the nature of disease from the physicians. He emancipated them from their trammels, and established a body of doctrine so sound that it has wholly superseded the airy theories of medicine previously current. Nay, it seems to have stifled similar phantasmata in their birth, for since the days of Cullen and Brown no new “system” of physic has obtained the slightest vogue in England.

Hunter’s consummate skill in the experimental investigation of physiological questions has been often and most deservedly extolled. That famous experiment with the egg—the most brilliant thing done with an egg since the days of Columbus—has set the question of vital heat at rest for ever.

“I put an egg,” he says, “into a freezing mixture about zero, and froze it, and then allowed it to thaw. Through this process I conceived that the preserving power of the egg must be lost, which proved the case. I then put the egg into a freezing mixture at 15°, and with it a new-laid one, to make the comparison on that which I should call alive, and the



difference in the time of freezing was  $7\frac{1}{2}$  minutes, the second one taking so much longer to freeze."

This experiment, and those which follow, may serve to show John Hunter's mode of advancing in knowledge. By a scrupulous observation of facts, he gradually ascended from the particular to the general, instead of assuming a principle *à priori*, and bending facts to square with theory. I cannot, in short, praise his method more highly or more justly than by saying that it was the one pursued by all who have obtained a lasting reputation as natural historians in ancient or in recent times. It was this which enabled Aristotle to carry off laurels in the field of zoology, as immortal as those which he earned in metaphysics and dialectics. He was one of the greatest observers that ever existed, says Cuvier, and had the most extraordinary genius for classification that nature has hitherto produced. Some of his aphorisms, adds the same great authority, from their generality presuppose an immense number of observations.

It was upon this that Galen's great reputation was primarily founded. He was one of the most successful prosecutors of anatomy of his time, although obliged by its prejudices to content himself with the examination of animals, and consequently falling into error when the structure of man differs from theirs. He made many discoveries in anatomy and physiology. He was the first to prove by experiment that the arteries did not during life contain air, but blood; and the first to show by their section the influence of the recurrent nerves on the

voice, which nerves he discovered and traced to the larynx.

It was this method, which, revived by the great triumvirate of Italian anatomists of the 16th century, Vesalius, Eustachius, and Fallopius, was followed by Fabricius and our countryman Harvey, and which was established by Bacon, as the “true logic of science.” Their undying reputation proves its success, and when we impartially weigh what Hunter accomplished, we need not fear to compare him with the shining lights that had gone before.

In order, however, to form a just estimate of his comparative merits, we must look at the circumstances in which his rivals in the Fasti of science were severally placed.

Thus, the position of Aristotle was most favourable, and both he and Galen received the best education which opulence and the severe discipline of Ancient Greece combined, could confer in philosophy and literature. In modern times Fabricius and Harvey, with the triumvirate I have mentioned, were equally fortunate, and if we pass from these eminent forerunners of Hunter to Cuvier, his distinguished successor, we shall find that he also had walked from his childhood in the paths of learning and science. His early education was the chief employment of his mother, a woman of superior understanding, united with the greatest tenderness. Without knowing the language, she made him repeat his Latin lessons to her; thus practising, unconsciously perhaps, a precept of Locke. He practised drawing under her eye, and she made him read numerous

historical and literary works. "It was thus," says M. Flourens, "that she developed and fostered that passion for reading, and that extended curiosity, which, as Cuvier says in his memoirs, were the mainsprings of his life."

At the academy of Stuttgardt, Cuvier received an excellent education, and when driven to battle with the necessities of life at eighteen, and seek a subsistence in a foreign land, he was rich not only in knowledge, but in the confidence acquired by the constant successes of his scholastic life.

The career of John Hunter differs from the others I have enumerated in one very important point. His father died early, and it was his misfortune to have a carelessly indulgent mother, so that he passed his boyhood in sauntering, in country sports, and in cabinet-making. It was not till the age of twenty, that hearing of his brother's success, he gave up the "*dolce far niente*" for the rest of his life; came to London—entered William Hunter's dissecting room, and worked as few have worked before or since. Poverty and contempt had been imminent, but he burst with giant strength the bonds of habit which had hitherto confined him, and escaped from the threatening spectres for ever.

This triumph achieved, the rest was comparatively easy. After this, we must no longer consider his career as an instance of "the pursuit of knowledge under difficulties." On the contrary, he had many special advantages. "He began," says Sir C. Bell, "to work for himself on the excellent basis of his brother's labours." William was a man of good



education, an accomplished anatomist, and rising into practice as an accoucheur. He had begun to form his museum, and his house gradually became the resort of those who wished to advance the art which they practised. Nor must we omit the important fact, that this brother, whose public and private tuition was destined to develop the genius of John Hunter, was ten years older than himself; a difference which would enable him to add something of paternal authority to brotherly persuasion. The same advantage was enjoyed by Charles Bell, and we have already seen with what fruits.

Yet, great as these advantages were, backed, too, by splendid genius and unwearied industry, did they entirely compensate for the want of early education? Some answer "Yes;" nay, it is even a question with them whether a better and more learned training might not have stunted that eager curiosity, that faculty for observation, that power of generalizing, which he possessed in so eminent a degree. This cannot be determined now; for, instead of knowing the whole history of his feelings and attainments, some fragments alone have reached us: but it is very certain that a learned education had not this freezing power with those distinguished men to whose career I alluded just now. And then, reflect on the advantages which good training gave them. Take Cuvier, for example. Whence did he derive the clearness of his descriptions, and the facility of his style both in written compositions and in oral communications? Whence, but from the literary toils of his boyhood at Stuttgardt? who, that has sat on the

benches of the amphitheatre at the Jardin des Plantes, will ever forget the impression which he produced ?

This clearness of expression cannot be predicated of John Hunter. When he gets beyond mere description, his language becomes obscure, and it is evident that composition was not easy to him. As a consequence of this, many of his MSS., among others, the catalogue of his Museum, were never completed. When we view him as a teacher, however, censure is swallowed up in admiration.

Nevertheless, it is said that he was deficient as a lecturer ; and he certainly seems to have wanted that vivid diction by which some men are enabled to enchain the attention of their audience, and lend the charm of novelty to the most familiar details. Sometimes, too, he appears to have been unable to express what he meant ; and it has been boldly assumed, that on such occasions he had no meaning at all, and was “labouring with the delivery of nothing.” Let us deem more nobly of John Hunter. Who can doubt, that in such instances, his mind was often wrapt in the dim vision of heights which he was not fated to ascend ? What labourer, in science or in art, has not felt the force of the “*nequeo monstrare et sentio tantùm* ?” Without fluency and vivacity, however, a lecturer can rarely be popular ; and hence John Hunter’s lectures were but thinly attended. Like Milton, he probably was content if he could “a fit audience find, though few ;” and he might, indeed, have been satisfied could he have anticipated the future glories of his pupils. Let us estimate his lectures, not by a cold

analysis, but by their effects. When Demosthenes had thundered forth a Philippic, the Athenians did not say, “What a fine oration !” but, “Let us march against Philip.”

The notes of John Hunter’s lectures which have come down to us, do not contain many specimens of his peculiar manner. The account of the treatment of cancer, however, is an example of his strong unsparing good sense, conveyed with extreme familiarity of style.

“No cure has yet been found ; for what I call a cure is an alteration of the disposition and the effects of that disposition, and not the destruction of the cancerous parts, which extirpation, however, will often cure as well as we could do by changing the disposition and action. Arsenic seems to have some power of this kind ; and its effects might be increased by being used internally and externally ; but its use is very dangerous, and, I am afraid, insufficient for the disease. This is a remedy which enters into the empirical nostrums, which are in vogue for curing cancer ; and among which, Plunkett’s holds the highest rank. But this is no new discovery ; for Sennertus, who lived the Lord knows how long ago, mentions a Rodriguez and Flusius who obtained considerable fame and fortune by such a composition. I was desired to meet Mr. Plunkett to decide on the propriety of using his medicine in a particular case. I have no objection to meet any body. It was the young one. The old one is dead, and might have died himself of a cancer for aught I know. I asked him what he intended



to do with his medicine. He said, "to cure the patient." "Let me know what you mean by that. Do you mean to alter the diseased state of the parts? or do you mean by your medicine to remove the parts diseased?" "I mean to destroy them," he replied. "Well, then, that is nothing more than I or any other surgeon can do with less pain to the patient." Poor Woollett, the engraver, died under one of these cancer-curers. He was under my care when this person took him in hand. He had been a lifeguardsman, I think, and had got a never-failing receipt. I continued to call on Woollett as a friend, and received great accounts of the good effects; upon which I said, if the man would give me leave to watch the appearance of the cancer, and see myself the good effects, and should be satisfied of its curing only that cancer, (mind, not by destroying it,) I would exert all my power to make him the richest man in the kingdom; but he would have nothing to do with me, and tortured poor Woollett for some time, till at last I heard the sound testicle was gone, and at length he died."

I have stated that Mr. Hunter's lectures were but thinly attended, but that he might have been satisfied could he have anticipated the fame of his pupils. Among those who lived in his house, there were several who attained great eminence in their profession, Dr. Jenner, Dr. Physick, and Sir Everard Home. But there were other pupils of his who had not these additional advantages, and yet drank deeper, far deeper, of the spring open to all. Among

them may be ranked Poli, Scarpa, Blumenbach; and there were others, who, fortunately for the progress of surgery, developed some of his favourite ideas with more fulness and precision than their master himself, and strove to instil into their scholars the doctrines and practice of their great instructor.

One of the most distinguished of these was Abernethy. In his *Essay on the Constitutional Origin of Local Diseases*, he has most ably made out his point; and both in the treatise and in his lectures, he surpassed John Hunter in the clearness with which he laid down the principle, and the practical tact with which he followed the law into its consequences.

Sir Astley Cooper, a still more illustrious name, was numbered among his pupils, and excelled him as a practical surgeon as much as he fell short of him in the qualities of a philosophic teacher. Every work of Cooper's, however, was based on the most patient anatomical examination, and thus became a faithful commentary on nature herself. His treatises on *Hernia*, on *Fractures and Dislocations*, and on *Diseases of the Breast*, might found a reputation singly: what have they not done united?

John Thomson, too, still left to us, was another pupil of Hunter's, who, in his celebrated work on *Inflammation*, followed out in a kindred spirit the views of his great master.

It is probably not going too far to say, that to the veneration in which these three distinguished men held the opinions and example of John Hunter,

and to their constant reference to him in their lectures, the propagation of his doctrines, and their influence on English surgery, has been mainly owing.

I will not detain you by observations on the personal peculiarities of John Hunter; but there is one anecdote which exhibits so strongly his practical tact, as well as his Johnsonian style of coming to the point, that I cannot refrain from quoting it.

He happened one day to call on Mr. Nicoll, when his wife was pregnant for the sixth time, and took the opportunity of asking him whether he intended to kill this as he had killed all the rest of his children. Mr. Nicoll, it seems, had adopted what is called the hardening system with all the previous ones. Not understanding the question, however, he asked John Hunter what he meant. "Why," said John Hunter, "do you know what is the temperature of a hen with her callow brood? because, if you don't, I'll tell you." He then proceeded to explain the necessity of warmth to young animals, and convinced Mr. Nicoll of the propriety of changing his plan, which he did, and with complete success.

It was finely said by Dr. Beddoes, that "when one heard that Hunter was at length the first surgeon in London, one felt a satisfaction like that which attends the distribution of poetical justice at the close of a well-told tale."

With this sentiment the intellect and the heart must alike agree; the honest and the clear-headed must equally exult in the ultimate success of John



Hunter. Yet I will observe in conclusion, that had his career been cut short at an earlier period, he would not have laboured in vain, far less would he have lived unhappy. Unlike him who toils for gain alone, and whose praise is measured by the wretched gold which he has accumulated—unlike the warrior or the statesman, who must appeal to success for justification, and whose failures are reckoned as crimes by exasperated nations—the man of science labours in a genial field, where exertion is its own reward ; for while the worshippers of power and wealth are sickened by each trifling disappointment, the humblest acolyte in the temple of knowledge feels that it is good to be there, and that even failures are but lessons. The pursuits of the scientific inquirer, when carried on in a right spirit, stand second among all the subjects which can occupy the human mind. Though faction and avarice unceasingly murmur in the vicinity, his mind remains unruffled by their clamour. Like the fleece of the Hebrew leader, while all around is parched, he alone is fostered by the gentle dews of heaven.

THE END.

